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Notes:

1. Untranslatable words are replaced with asterisks (***).
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CLAIM + DETAILED DESCRIPTION

[Claim(s)]

[Claim 1] The inside by the side of the support which supports said arm and this arm in the robot constituted in support of an arm pivotable, The robot characterized by preparing the contact part which defines the standard rotation position of the arm concerned in contact with said positioning member when the attachment for attaching a positioning member to one side removable is formed and another side is made to rotate said arm to said support side.

[Claim 2] He is the robot according to claim 1 characterized by for said positioning member consisting of a positioning pin which has a thread part, and said attachment consisting of a tapped hole which screws the thread part of the positioning pin concerned.

[Claim 3] The end faces by the side of said arm and support counter mutually, and said attachment is formed in one end-face part of the inside by the side of said arm and support. He is the robot according to claim 1 or 2 characterized by said contact part consisting of an inner side end face of the notch formed so that it might become the end-face part of another side of the inside by the side of said arm and support from the perimeter with ** in an inner direction.

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the positioning composition for starting the robot constituted in support of an arm pivotable, especially defining the standard rotation position of an arm.

[0002]

[Problem to be solved by the invention] If an example of the arm composition in a multi-joint type robot is described, to the base, a body, a lower arm, an upper arm, a twist arm, a wrist, and a hand attachment are connected pivotable in order, and it is constituted.

[0003] By the way, when manufacturing a robot, teaching the standard rotation position (home position) of an arm is performed by the final process. When it explains taking the case of the case where the standard rotation position of a twist arm [as opposed to the above-mentioned upper arm for this] is taught, [an upper arm] The shaft which attaches a twist arm, and the motor which drives this shaft are formed, and after performing the assembly which twists at a shaft and connects an arm, operation which turns a twist arm and is stopped in a standard rotation position is performed. And the position of a motor when a twist arm stops in a standard rotation position is taught as a standard rotation position to a control system. Thereby, operation of a twist arm is controlled on the basis of an above standard rotation position.

[0004] By the way, in the former, in order to define the standard rotation position of a twist arm, it twisted with the upper arm and the positioning mechanism was established between arms. The ring which rotates in the predetermined angle range is prepared, for example in the end face of an upper arm, and this positioning mechanism is twisted with this ring, it fixes a positioning pin to the both sides of the end face of an arm, and is constituted. And turn a twist arm in the predetermined direction, twist it, and the positioning pin of an arm is made to contact the positioning pin of a ring. Furthermore, after both this pin has contacted, a ring twists, and it rotates in one with an arm, and a stop position is made a twist arm when a ring hits a stopper and stops with a standard rotation position. [in addition, the Reason which enabled it to rotate a ring in the predetermined angle range] Since it will twist with an upper arm and a positioning pin will be fixed and prepared in both arms, when the positioning pin by the side of an upper arm is fixed to a direct upper arm It is because it becomes impossible to correspond to the user who demands for the degree of rotation angle of a twist arm to become smaller than 360 degrees, and to rotate 360 degrees now.

[0005] However, since it must constitute from such a conventional positioning mechanism so that a ring may be rotated in the predetermined angle range, structure is complicated and there is a problem that a manufacturing cost becomes high. On the other hand, there is also a robot of the structure which has not incorporated the positioning mechanism. By this robot, when the fixture for positioning, for example, the fixture equipped with the dial gage, must be manufactured and twisted, it must measure and ask for the standard rotation position of an arm with a gauge and the fixture situation will become expensive, there is a problem that positioning is difficult.

[0006] This invention was made in view of the above-mentioned situation, the standard rotation position of an arm can be defined easily, moreover, the purpose is simple for positioning composition, and it is to offer the robot which can attain abatement-ization of cost.

[0007]

[Means for solving problem] In invention of Claim 1, if a positioning member is attached to one side in by the side of the support which supports an arm and this arm and an arm is rotated, a

positioning member and a contact part will contact and an arm will be stopped in a standard rotation position. If a positioning member is removed after defining the standard rotation position of an arm, the arm can rotate 360 degrees or more.

[0008] In invention of Claim 2, a positioning pin can be easily attached with a screw thread. Moreover, while the portion which constitutes a positioning mechanism from invention of Claim 3 cannot project to the method of outside and does not spoil appearance, there is no possibility that an operator may hook a hand etc.

[0009]

[Mode for carrying out the invention] It explains hereafter, referring to Drawings per work example of this invention. The robot's entire configuration is shown in drawing 5 . The base 2 which a robot 1 is constituted as a perpendicular many joint type, and is fixed to a floor as shown in this drawing, The body 3 connected with this base 2 possible [level revolution], and the lower arm 4 connected with this body 3 possible [the revolution to a sliding direction], It has the upper arm 5 connected at the head of this lower arm 4, and the wrist 7 which twisted at the head of this upper arm 5, and was connected pivotable and which twisted and was connected with the sliding direction possible [revolution] at the head of an arm 6 and this twist arm 6. And a wrist 7 is twisted at a head, and is equipped with the pivotable flange 8, and a hand is attached to this flange 8. In addition, the above-mentioned body 3, a wrist 7, and a flange 8 constitute a robot's 1 arm with the lower arm 4, the upper arm 5, and the twist arm 6. [0010] Drawing 4 twists with the upper arm 5, and shows connection composition with an arm 6. As shown in this drawing, the motor 10 as a source of a drive of the twist arm 6 is arranged in the inside of the housing 9 which constitutes the outer shell of the upper arm 5. And the reduction gear 11 is connected with the motor 10. This reduction gear 11 slows down and outputs rotation of a motor 10, that output axis 12 has in one the crank part 13 which projects ahead from one flank, and the ring-like connection part 14 is further formed in the point of this crank part 13 at one.

[0011] The circular opening 16 is formed in the end-face wall 15 of the point of the housing 9 in the upper arm 5 which constitutes the support side of the twist arm 6. The outer rotor 17a of the cross roller bearing 17 has fitted into this opening 16 by insertion from the front. And the presser-foot plate 18 is being fixed to the front of the end-face wall 15 of housing 9 with Bolt 18a (refer to drawing 1), and the omission stop of the outer rotor 17a from an opening 16 is made with this presser-foot plate 18. Thus, the connection part 14 of said output axis 12 fits into the inner rotor 17b of the cross roller bearing 17 with which the opening 16 was equipped, and it is supported pivotable.

[0012] The short connecting shaft part 21 of the hollow which projects back on the other hand in the end-face wall 20 of the back end part of the housing 19 which constitutes the outer shell of the twist arm 6 is formed in one. This connecting shaft part 21 is being fixed to the inner

rotor 17b of a cross roller bearing 17 by the connection part 14 of said output axis 12 with the bolt 22 while fitting support is carried out. By the above connection composition, if a motor 10 rotates, the rotation will be slowed down and it will twist, and it is transmitted to an arm 6, and the twist arm 6 concerned twists and rotates.

[0013] Now, as it is indicated in drawing 2 as the end-face wall 20 of the housing 19 which twists with the presser-foot plate 18 which constitutes the end-face part by the side of front [of said upper arm 5], and constitutes the end-face part on the backside of an arm 6, the rectangular shape of the almost same size is countered through few [nothing and] clearances. And if the twist arm 6 is clockwise rotated about 45 degrees from the state with which the presser-foot plate 18 and the end-face wall 20 agreed as shown in drawing 2 (b) as shown in drawing 2 (a), four corners of the presser-foot plate 18 will twist, and it will separate from opposite with the end-face wall 20 of an arm 6, and will expose. In addition, since drawing 2 shows the twist arm 6 where a cover 23 is attached to both sides of housing 19, both sides of the twist arm 6 are larger than the upper arm 5. Since the opening (not shown similarly) for incorporating the driving device (not shown) of a wrist 7 or a flange 8 is incidentally formed in both sides of the housing 19 of the twist arm 6, it is for a cover 23 plugging up the opening.

[0014] When about 45 clockwise rotations rotate the above-mentioned twist arm 6, it sees from a transverse plane among four corners of the presser-foot plate 18 to expose, and as shown in drawing 1 and drawing 2 , the tapped hole 24 as an attachment is formed in the lower left corner. When teaching the standard rotation position of the twist arm 6, the positioning pin 25 as a positioning member is screwed in the above-mentioned tapped hole 24. This positioning pin 25 is equipped with a circular stating part 26 and a circular thread part 27, and the outside diameter size of the stating part 26 is finished with sufficient accuracy. In addition, the hexagon socket 26 for inserting a hexagonal wrench (not shown) is formed in the stating part 26 of the positioning pin 25. On the other hand, among the end-face walls 20 of the twist arm 6, from the center of the bottom, while becoming ** from the perimeter of the end-face wall 20 toward an inner direction, the notch 29 which goes clockwise and becomes deep gradually is formed in the part covering the corner corner by the side of the lower right. And the clockwise end face is made into the contact surface 30 as a contact part among the inner surfaces of this notch 29.

[0015] Next, an operation of the above-mentioned composition is explained. After connecting the twist arm 6 with the connection part 14 of an output axis 12, in order to make a standard rotation position rotate the twist arm 6 and to teach the position of a motor 10, first, the twist arm 6 is rotated about 45 degrees clockwise, and it is made exposed [the tapped hole 24 of the upper arm 5]. And the thread part 27 of the positioning pin 25 is screwed and bound tight to this exposed tapped hole 24, and it fixes to it.

[0016] Then, the twist arm 6 is rotated counterclockwise. Then, with rotation of this twist arm 6, the positioning pin 25 twists relatively and invades in the notch 29 by the side of an arm 6. And

the contact surface 30 of notch 29 contacts the positioning pin 25 eventually, it twists by this, and an arm 6 stops in a standard rotation position. Then, a control system is made to memorize the rotation position of a motor 10, where the twist arm 6 is held in this standard rotation position.

[0017] Thus, according to this example, the positioning pin 25 can be attached to a tapped hole 24, and the twist arm 6 can be easily set to a standard rotation position by operation of twisting until the contact surface 30 of notch 29 contacts the positioning pin 25, and turning an arm 6 counterclockwise.

[0018] Moreover, the tapped hole 24 required for positioning, the positioning pin 25, and notch 29 can be manufactured in low cost. Moreover, the positioning pin 25 is removable, since the positioning pin 25 is removed from a tapped hole 24 after setting the twist arm 6 as a standard rotation position and doing predetermined work, the degree of rotation angle of the twist arm 6 is not narrowed by the positioning pin 25, and rotation of 360 degrees or more is possible. Therefore, it is not necessary to add the structure for guaranteeing rotation of 360 degrees or more. From the above thing, the mechanism for positioning the twist arm 6 concerned in a standard rotation position can be manufactured inexpensive, guaranteeing that the twist arm 6 rotates 360 degrees or more, and abatement-ization of a robot's 1 manufacturing cost can be attained.

[0019] Since the notch 29 which formed the tapped hole 24 in the front part of the presser-foot plate 18, and formed the contact surface 30 in the end-face wall of housing 19 20 can moreover constitute While the component of a positioning mechanism does not project in the method of outside and being able to avoid large-sized-ization, an operator hooks neither a hand nor clothing.

[0020] In addition, this invention is not limited to the work example which describes above and is shown in Drawings, and following escapes or change are possible for it. A tapped hole 24 may be twisted, it may form in the arm 6 side, and notch 29 may be formed in the upper arm 5 side. The height (direction which met the axis of rotation of the twist arm 6) of notch 29 is high, and when the detaching operation of the positioning pin 25 could be carried out to the tapped hole 27 within the notch 29 and the twist arm 6 is turned clockwise, it is not necessary to make it not exposed of a tapped hole 27. While replacing a tapped hole 24 with a mere hole, it is good also as a shank which fits the thread part 27 of the positioning pin 25 into the above-mentioned hole densely. When a tapped hole 24 is formed in the side piece of the housing 9 of the upper arm 5, the projected part (contact part) which projects to a tapped hole 24 in the housing 19 of the twist arm 6 is formed and the positioning pin 25 is screwed in a tapped hole 24, When the positioning pin 25 concerned projects outside from the side of the upper arm 5 and rotates the twist arm 6, you may constitute so that the above-mentioned projected part (contact part) may contact a positioning pin and a reference position may be defined. When

setting up the standard rotation position of the upper arm 5 to the lower arm 4, you may apply the positioning composition of this invention. Moreover, you may apply, when defining the standard rotation position of the body 2 to a base 2, and in short, when supporting an arm pivotable, and setting up the standard rotation position of the arm, it can apply widely.

[Translation done.]